

Abstract

In November 2024, the European council definitively adopted the text for a revised directive on urban wastewater treatment, which will impose large wastewater treatment plants to lower their nitrogen discharge levels in the coming years. This represents an unprecedented opportunity to develop and evaluate new innovative solutions for nitrogen management, and to help closing the N-cycle.

The Red-SuN project aims at proposing and evaluating new routes to treat and/or recover nitrogen from wastewater within this revised directive without compromising the carbon-footprint of the plants. An in-depth evaluation of the current practice in terms of nitrogen treatment in the four countries participating to the project (France, Finland, Poland and Belgium) and of the required optimization/retrofitting of the existing plants to meet the revised European directive forms the starting point of the project. A full evaluation of innovative technologies to recover nitrogen from wastewater will also be carried out, as well as the impact assessment of the current and future N-related unit processes in terms of energy and chemical consumption and GHG emissions. The different scenarios will be assessed on a plant-wide level through simulation of full-scale installations, in order to propose and validate a methodology to select the best nitrogen management solutions to be implemented. Throughout the project, a close collaboration will be maintained with various stakeholders (water utilities in particular) who will share their data, their experiences and their vision towards the implementation of the new directive in a circular economy context.

The Red-SuN project targets the improvement of recovery technologies for nitrogen circularity between wastewater treatment, agriculture and industrial resource management sectors. This allows wastewater treatment utilities and industries to meet EU standards while reducing costs and keeping the carbon footprint low, providing agriculture with a sustainable alternative to synthetic fertilizers and supporting industrial circular economy practices.

The impact is expected to include reduced nitrogen pollution, operational savings, decreased fertilizer dependency, and contributions to EU goals in terms of circular economy, climate, environmental protection and public health.

Five academic partners will be associated in the Red-SuN project (INRAE and INSA Toulouse, France, Aalto, Finland, UGent, Belgium and Gdańsk-Tech, Poland). In addition to the competence required to develop the methodology and the models, the consortium partners are carrying out collaborative work with public end-users (water utilities, regulatory bodies...) and private end-users (water treatment companies, software developers, farming and agro-industry, fertilizer's companies...). In particular, the partners will benefit from long-term collaborations with local water utilities, four of them having confirmed their participation in the project: Lyon Métropole (France), Helsinki Region Environmental Services (Finland), Aquafin (Belgium) and Chamber of commerce: Water Utilities (Poland). They will contribute to the definition of the evaluation criteria, give feedback on the assessed process schemes and commit to the sustainable implementation of successful project outcomes.



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► Project partners

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- GDANSK UNIVERSITY OF TECHNOLOGY - POLAND
- GHENT UNIVERSITY - BELGIUM
- NATIONAL INSTITUTE OF APPLIED SCIENCES - FRANCE

► Funding organisations

ANR (FRANCE) / AKA (FINLAND) /
NCBR (POLAND) / FWO (BELGIUM)

► Duration

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► Contact

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